



INTRODUCTION

The Washington Forest Practices Board proposes to modify the Forest Practices Rules. The objectives of this proposal are to more fully address the impacts of forest practices on water quality, salmon habitat, and other aquatic and riparian resources. The Forest Practices Rules to be modified are identified in Title 222 of the Washington Administrative Code (WAC). The proposed rules consist of new sections, sections to be amended, and sections to be repealed (WAC 222-10-043, 222-16-088, 222-24-025, 222-30-030). The primary impetus for the adoption of the rule proposal has been the recent decline in fish stocks throughout much of Washington State and the large number of Washington streams identified to have water quality problems. The 1999 Legislature declared this an emergency and encouraged the Forest Practices Board to adopt new rules consistent with the April 1999 Forests and Fish Report (RCW 76.09.055).

The Forest Practices Board has determined that changes in the Forest Practices Rules have the potential for significant adverse environmental impacts (i.e., a determination of significance [DS] was made under the State Environmental Policy Act [SEPA]). When a DS is made under SEPA, an environmental impact statement (EIS) is required to analyze the significant environmental impacts of the alternatives under consideration. This document is the Final EIS and has been prepared under the guidelines and requirements of SEPA. This summary section provides a description of the purpose and need for action, the significant issues that have been identified as related to the action, the proposal and the alternatives, and the environmental impacts of the proposal and the alternatives.



Summary

PURPOSE AND NEED FOR ACTION

A detailed statement of the purpose and need can be found in Section 1.3. A summary of this purpose and need is presented here.

As noted in the background section (Section 1.2), in recent years, concern has grown over the need to modify the Forest Practices Rules to adequately protect riparian and aquatic resources. Particular concerns include the issue that riparian buffer and leave tree requirements may not provide enough protection for riparian functions and that rules regarding forest roads may still allow too much sediment production. Four areas led to these concerns: 1) data from field verification indicated that the water typing system may be inadequate; 2) prescriptive outcomes from watershed analysis suggested that prescriptions in the rules were inadequate; 3) many salmonid fish species were listed on the federal threatened and endangered species lists; and 4) more than 660 Washington streams were identified as water-quality-impaired under the Clean Water Act.

The primary purpose of the proposed action is to achieve the four goals identified by the Forest Practices Board (FPB minutes of September 22, 1998). These goals were developed to satisfy the need identified above. The four goals are as follows:

1. Provide compliance with the Endangered Species Act (ESA) for aquatic and riparian-dependent species on non-federal forest lands.
2. Restore and maintain riparian habitat on non-federal forest lands to support a harvestable supply of fish.
3. Meet the requirements of the Clean Water Act for water quality on non-federal forest lands.
4. Keep the timber industry economically viable in the state of Washington.

Based on a full analysis of the proposal and reasonable alternatives, the Forest Practices Board will determine whether and how to modify the current rules through amending current rules, repealing current rules, or adopting new rules. Rules pertaining to water quality must be approved by the Washington State Department of Ecology (Ecology). The schedule for the Forest Practices Board's rule adoption process is posted on its website: www.wa.gov/dnr.



SIGNIFICANT ISSUES

As a result of both public and internal scoping, the following significant issues have been identified for analysis in this EIS:

- Sediment
- Hydrology
- Riparian habitat
- Wetlands
- Water quality
- Fish
- Wildlife
- Fire
- Cultural resources

OTHER ISSUES AND RELATED DOCUMENTS

SEPA requires an EIS to analyze the *significant* impacts (WAC 197-11-440). Impacts not considered significant do not have to be addressed. Further, SEPA emphasizes that an EIS should analyze the *environmental* impacts (WAC 197-11-448). The intent is that the responsible agency will weigh the EIS as one of several potential pieces of information needed in the decision-making process. The EIS is not required to evaluate and document all possible effects and considerations, such as economic competition, personal income and wages, and social impacts. Therefore, this document focuses on a comparison of a reasonable range of alternatives and an analysis of the environmental impacts for significant issues.

Economic impacts related to the proposed rule changes will be addressed separately by the Small Business Economic Impact Statement required by the Regulatory Fairness Act (chapter 19.85 RCW) and the Cost Benefit Analysis required by the Administrative Procedure Act (chapter 34.05 RCW). The Small Business Economic Impact Statement analyzes the disparity of the impact rules on large businesses versus small businesses. Both of these documents will be posted on the Forest Practices Board website (www.wa.gov/dnr) when they are completed. They will also be available from the Washington State Department of Natural Resources (DNR), Forest Practices Division by calling (360) 902-1400.



Summary

PROPOSAL AND THE ALTERNATIVES

Three alternatives are considered in detail in the EIS: 1) the No Action Alternative (Alternative 1); 2) the proposed action (Alternative 2); and 3) an alternative that is more protective than the proposed action (Alternative 3). It should be noted that mitigation measures are incorporated directly into each of the alternatives, since they essentially represent a set of different measures for mitigating the environmental effects of forest practices. The three alternatives are summarized in detail in Table S-1, and their derivation is summarized below.

- Alternative 1 represents the No Action Alternative. It entails continuing with the existing permanent Forest Practices Rules and does not include the revisions to these rules produced by the water typing, salmonid, or Forests and Fish emergency rules. SEPA requires the No Action Alternative to be based only on permanent rules, not temporary rules. Alternative 1 is defined in the Washington Forest Practices Board Rule Book, dated November 1998.
- Alternative 2 represents the alternative defined by the Forests and Fish Report (April 1999), as supplemented by House Bill 2091 and as subsequently refined. The groups contributing to the development of this report include state agencies (DNR, the Washington State Department of Fish and Wildlife [WDFW], and Ecology), federal agencies (U.S. Fish and Wildlife Service [USFWS], National Marine Fisheries Service [NMFS], and the U.S. Environmental Protection Agency [EPA]), the Colville Confederated Tribes, the Northwest Indian Fisheries Commission, the Washington State Association of Counties, the Washington Forest Protection Association, and the Washington Farm Forestry Association.
- Alternative 3 is representative of the alternatives produced by groups that were not among the authors of the Forests and Fish Report. Separate proposals were made by an environmental caucus (led by the Washington Environmental Council and the Audubon Society) and by the Muckleshoot Indian Tribe, Yakama Indian Nation, and Puyallup Indian Tribe. Elements of these proposals are incorporated into Alternative 3.



Table S-1. Summary Description of the Alternatives Considered in Detail

(Page 1 of 4)

Forestry Module Topic	Alternative 1 (No Action = Current Rules)	Alternative 2 (Proposed Action = Forests and Fish Report w/modification)	Alternative 3
Water Typing	<p><u>Five-type System</u> <u>Fish-bearing waters</u> 1=shorelines of the state 2=generally > 20 feet 3=generally < 20 feet</p> <p><u>Non fish-bearing waters</u> 4=generally > 2 feet 5=generally < 2 feet</p>	<p><u>Three-type System</u> <u>Fish habitat waters</u> S=shorelines of the state F=other fish habitat waters</p> <p><u>Non fish-habitat waters</u> Np=perennial waters Ns=seasonal waters</p>	<p><u>Three-type System</u> <u>Geomorphic-based</u> Gradient = 0 – 20 % Gradient = 20 – 30 % Gradient = > 30 %</p>
Riparian Habitat	<p><u>Shorelines of the State (Type 1)</u> Requirement of no more than 30% volume removal every 10 years within 200 feet of shoreline.</p> <p><u>Westside Fish Habitat (Type 1-3)</u> 25 – 100 feet managed buffer</p> <p><u>Westside Non Fish Habitat (Type 4-5)</u> Type 4: riparian leave tree areas sometimes required Type 5: no requirements</p>	<p><u>Shorelines of the State (Type S)</u> Requirement of no more than 30% volume removal every 10 years within 200 feet of shoreline.</p> <p><u>Westside Fish Habitat (Type F)</u> No management allowed inside channel migration zone (CMZ). Three zones: core, inner, outer Core Zone: no management Inner Zone: 2/3 SPTH buffers on streams <= 10 feet wide, managed with stand requirements; 3/4 SPTH buffers on streams >10 feet wide with stand requirements Outer Zone: SPTH buffer with 10-20 trees/acre</p> <p><u>Westside Non Fish Habitat (Type N)</u> Perennial: 50-foot no-cut buffer, sensitive sites; discontinuous with at least 50% buffer on length Seasonal: 30-foot equipment limitation zone</p>	<p><u>Shorelines of the State</u> Requirement of no more than 30% volume removal every 10 years within 200 feet of shoreline.</p> <p><u>Westside Fish Habitat</u> No management allowed inside channel migration zone (CMZ) or beaver habitat zone (BHZ). 200 feet additional managed buffer; only thin to improve riparian function through SEPA</p> <p><u>Westside Non Fish Habitat</u> No management allowed inside channel disturbance zone (CDZ). In addition, the following buffers are added: Perennial: 100-foot continuous no-cut buffer Seasonal: 70-foot no-cut buffer</p>



Summary

Table S-1. Summary Description of the Alternatives Considered in Detail

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Forestry Module Topic	Alternative 1 (No Action = Current Rules)	Alternative 2 (Proposed Action = Forests and Fish Report w/modification)	Alternative 3
Riparian Habitat (continued)	<p><u>Eastside Fish Habitat</u> 30- to 300-foot managed buffer</p> <p><u>Eastside Non Fish Habitat</u> Type 4: riparian leave tree areas sometimes required Type 5: no requirements</p> <p><u>Small Landowners</u> None</p>	<p><u>Eastside Fish Habitat</u> Three additional zones: core, inner, outer. Core: no management Inner: 70 or 100 feet; management with stand requirements Outer: SPTH buffer with 10, 15 or 20 trees/acre</p> <p><u>Eastside Non Fish Habitat</u> Perennial: 50-foot managed buffer with uneven-aged management; discontinuous buffer with up to 300 ft. clearcut, but maximum of 30% length under even-aged management; plus 30-foot equipment limitation zone Seasonal: 30-foot equipment limitation zone</p> <p><u>Small Landowners</u> Exemption from new rules for <20-acre parcels for landowners who own less than 80 acres of forested land; DNR can add 15% of stand volume to current riparian buffers</p>	<p><u>Eastside Fish Habitat</u> 200 feet managed buffer; only can thin to improve riparian function through SEPA</p> <p><u>Eastside Non Fish Habitat</u> Perennial: 100 feet continuous no-cut buffer Seasonal: 70-foot no-cut buffer</p> <p><u>Small Landowners</u> Exemption from new rules for <20-acre parcels for landowners who own less than 80 acres of forested land; DNR can add 15% of stand volume to current riparian buffers</p>
Unstable Slopes	Reviewed in forest practices application process SEPA trigger	Reviewed in forest practices application process; improved definitions, screens, training and field verification SEPA trigger Addresses public safety Identification of high hazard and moderate hazard landforms	Reviewed in forest practices application process; improved definitions, screens, training and field verification SEPA trigger Addresses public safety Identification of high hazard and moderate hazard landforms. Add all >80% planar slopes to definition of high hazard; no harvest on high hazard; additional 50-ft. buffer around high hazard slopes; all > 50% slopes classed as moderate hazard

Summary



Table S-1. Summary Description of the Alternatives Considered in Detail

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Forestry Module Topic	Alternative 1 (No Action = Current Rules)	Alternative 2 (Proposed Action = Forests and Fish Report w/modification)	Alternative 3
Forest Roads	Maintain current construction standards RMAP only when requested by DNR or watershed analysis	Improved new construction standards; improved BMPs for maintenance Required RMAPs within 5 years; all roads in compliance within 15 years; inventory orphan roads	Improved new construction standards; improved BMPs for maintenance Required RMAPs within 5 years; all roads in compliance within 10 years; inventory orphan roads No net increase in road mileage on a per unit basis (i.e., basin or tree farm by landowner)
Wetlands	<p><u>Wetland Management Zones</u> Protection of Type A and B wetlands with 25- to 100-foot wide WMZs; minimum wetland size protected is 0.25 acre</p> <p><u>Forested Wetland Harvest</u> Clearcut harvest allowed Equipment limitation on forested wetlands.</p> <p><u>Roads and Landings</u> Generally 1:1 replacement ratio</p> <p><u>Classification System</u> Current system</p>	<p><u>Wetland Management Zones</u> Protection of Type A and B wetlands with 25- to 100-foot wide WMZs; minimum wetland size protected is 0.25 acre</p> <p><u>Forested Wetland Harvest</u> Clearcut harvest allowed. Wetlands working group to make recommendations regarding protection via adaptive management.</p> <p><u>Roads and Landings</u> Generally 2:1 replacement ratio and no net loss of function Minimum mapping size to 3 acres for forested wetlands</p> <p><u>Classification System</u> GIS update system Wetlands working group to revise system via adaptive management</p>	<p><u>Wetland Management Zones</u> Protection of Type A and B wetlands with 100- to 200-foot wide WMZs; minimum wetland size protected is 0.25 acre</p> <p><u>Forested Wetland Harvest</u> Partial harvest allowed; leave snags, non-merchantable trees, understory vegetation, and 70% canopy closure</p> <p><u>Roads and Landings</u> Generally 2:1 replacement ratio and no net loss of function</p> <p><u>Classification System</u> Adopt geomorphic classification</p>
Watershed Analysis	<p>Mandatory for DNR as funding allows Voluntary for landowners Nine modules currently included Improved hydrology and water quality modules</p> <p>Prescriptions written for all modules</p>	<p>Mandatory for DNR as funding allows Voluntary for landowners Nine modules plus new ones Improved hydrology and water quality modules New cultural and restoration modules</p> <p>No prescriptions for riparian, mass wasting, and surface erosion.</p>	<p>Mandatory for DNR as funding allows Voluntary for landowners Nine modules plus new ones Improved hydrology and water quality modules Monitoring of forest practices in watersheds without watershed analysis. New cultural and restoration modules. No prescriptions for riparian, mass wasting, and surface erosion</p>



Summary

Table S-1. Summary Description of the Alternatives Considered in Detail

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Forestry Module Topic	Alternative 1 (No Action = Current Rules)	Alternative 2 (Proposed Action = Forests and Fish Report w/modification)	Alternative 3
Adaptive Management	CMER projects used to make improvements	CMER formalized, independent scientific peer review process established. Forest Practices Board responsible. Dispute resolution process established. Conduct validation and effectiveness monitoring	Adaptive management system is directed by the Forest Practices Board , including how stakeholders should be involved New stakeholder review group formed
Forest Pesticides	Current rules allow no chemicals in streams 50-foot buffer along streams 100-foot buffer adjacent to other properties 200-foot buffer adjacent to residences	No chemicals in streams or core or inner zones. Variable width buffer depending on equipment and wind conditions New BMPs	Protect plants of cultural value Require 50-foot buffer for hand application of chemicals Use of alternate plan for restoration of riparian functions
Cultural Resources	Class IV special if state registered site or cairn, grave, or glyptic record Class III if cultural resource and requires meeting with landowner and tribe Other accepted assessment and mitigation tools to protect cultural resources in riparian areas	Cultural resources treated the same as under Alternative 1, except for below Watershed analysis module added	Cultural resources treated the same as under Alternative 1
Hydrology	Rain-on-snow rule Eastside hydrology watershed analysis module	Rain-on-snow rule Eastside hydrology watershed analysis module	Rain-on-snow rule strengthened to limit harvest based on cumulative past harvest Eastside hydrology watershed analysis module



ENVIRONMENTAL IMPACTS AND CONCLUSIONS

This section summarizes the environmental impacts associated with each of the alternatives. This summary also includes the major conclusions and significant areas of controversy and uncertainty.

Because of the high degree of complexity of the proposed rule changes, as well as the number of individual rules involved, this summary can only present highlights of the impacts and major conclusions. A real understanding of the impacts and conclusions of this EIS requires that the reader review Chapter 2 and Table 2-14 at a minimum, which display the impacts and conclusions on a comparative basis for the three alternatives. A more comprehensive understanding would be attained by reading Chapter 3, which analyzes the alternatives in detail. With this qualification in mind, the following brief summary is presented.

Sediment

- Under Alternative 1, the risk of fine and coarse sediment delivery to streams and bank instability on small streams would be high primarily because of 1) the inadequacy of rules and best management practices that address road drainage, 2) the general lack of road maintenance and abandonment plans, and 3) the lack of riparian management zones on Type 4 and 5 streams.
- Alternative 2 would produce a low to moderate risk of fine sediment delivery primarily because of 1) an outcome-based policy incorporated into the forest road rules that directly addresses the desired outcome of avoiding resource damage, 2) improved rules and best management practices that address road drainage, 3) required development and implementation of road maintenance and abandonment plans within 15 years, and 4) a minimum of a 30-foot equipment limitation zone required on all streams. Under this alternative the risk of effects from coarse sediment delivery to streams and bank instability along small streams would also be low to moderate. The low rating is associated with many of the items identified for fine sediment, plus improved screening techniques for unstable slopes and riparian management zone protection along most sensitive areas on streams. The moderate rating is associated with the lack of riparian management zones along many steep headwater streams. The low degree of protection along these streams produces a high degree of uncertainty regarding the level of risk.
- Alternative 3 would produce a low risk of fine and coarse sediment delivery to streams and the lowest risk overall, because it incorporates the protection measures of Alternative 2. It would also 1) require no net increase in road densities, 2) require that road maintenance and abandonment plans be developed and implemented within 10 years, and 3) require that riparian management zones on all streams, including steep, seasonal streams, which would include channel disturbance zone buffers.
- It should be noted that drainage from roads along stable slopes onto unstable slopes is not addressed by any of the alternatives, and this is a concern.



Summary

Hydrology

- Under Alternative 1, the risk of timber management-related increases in peak flows would be moderate because they are only directly addressed under watershed analysis or DNR intervention, rules and best management practices that address road drainage are inadequate, and road maintenance and abandonment plans generally are not required.
- Alternative 2 would also produce a moderate risk of timber-management-related increases in peak flows because watershed analysis would likely be conducted with less frequency, and no other rules would directly address cumulative watershed harvest. Road drainage to streams would, however, be reduced through strengthened rules, and best management practices and road maintenance and abandonment plans would be implemented.
- Under Alternative 3, the risk of timber-management-related increases in peak flows would be low because this alternative would be similar to Alternative 2. The rules would also directly address the cumulative hydrologic maturity of the rain-on-snow zone, and there would be no net increase in road density.

Riparian Habitat

- Alternative 1 would result in a high risk of diminished large woody debris (LWD) recruitment along fish-bearing streams and a very high risk along nonfish-bearing streams. It would result in a moderate to high risk of diminished shade along fish-bearing streams and a very high risk along nonfish-bearing streams. The risk of diminished leaf and needle litter would be moderate along fish-bearing streams and very high along nonfish-bearing streams. A moderate to high risk of microclimate effects would occur along all streams. Because of the identified risks, it is unlikely that Alternative 1 could result in properly functioning aquatic ecosystems, in general.
- Under Alternative 2, the risk of diminished LWD recruitment along fish-bearing streams would be low on the west side and moderate on the east side (potentially high in some areas of the eastside), moderate along perennial nonfish-bearing streams, and high along seasonal nonfish-bearing streams. It would result in low to moderate risk of diminished shade along fish-bearing streams, moderate risk along perennial nonfish-bearing streams, and high risk along seasonal nonfish-bearing streams. The risk of diminished leaf and needle litter would be low along fish-bearing streams, moderate along perennial nonfish-bearing streams, and high along seasonal nonfish-bearing streams. A moderate risk of microclimate effects would occur along fish-bearing streams, and a high to very high risk would occur along nonfish-bearing streams. Overall, Alternative 2 appears to provide adequate protection for most riparian functions except for those along many small streams which have no riparian management zones. In general, the risk of inadequate protection of riparian function appears to be higher for the eastside. The risks are enhanced in watersheds that are already degraded. There is a high degree of uncertainty regarding the impact of insufficient LWD recruitment, leaf/needle litter recruitment, shade, and microclimate along small nonfish-bearing streams on downstream fish habitat.



- Under Alternative 2, the fact that small landowners, owning less than 80 acres of forested land in Washington, would have to implement a lower level of environmental protection in riparian areas produces an increased level of concern. In watersheds with a high proportion of these small landowners, this rule would increase the risk of not providing a properly functioning aquatic ecosystem.
- Based on long-term modeling, Alternative 2, Option 1 (thinning from below), would shorten the time required for functional or key piece size LWD to be produced, especially in productive stands along large streams. Along small streams, thinning does not appear to provide benefits and may hinder LWD production. Option 2 would require longer to produce functional or key piece size LWD along larger streams; however, it would produce greater quantities earlier along smaller streams.
- Alternative 2 is the only alternative that includes incentives for LWD enhancement; this may be significant for restoring degraded streams in the near-term.
- Alternative 3 would result in low risk of diminished LWD recruitment, low risk of diminished shade, low risk of diminished leaf and needle litter, and a low to moderate risk (potentially high along steep, nonfish-bearing streams) of microclimate changes along fish-bearing streams and nonfish-bearing streams.
- Riparian habitat is also protected under the Shorelines Management Act within shoreline management zones along larger streams classified as shorelines of the state. Under Alternative 1, this Act would produce additional protection along Type 1 streams. Riparian management zones prescribed under Alternative 2 would likely provide more leave trees than provided in a shoreline management zone along Type S streams with a channel migration zone. If no channel migration zone is present, the shoreline management zone would likely leave more trees than the riparian management zone in the short-term. Over the long-term, riparian management zones would provide more protection than a shoreline management zone. Under Alternative 3, riparian management zones would be more protective than shoreline management zones, except for shorelines of the state along steep streams.

Wetland Habitat

- Alternatives 1 and 2 would result in low to moderate risk of impacts associated with harvest adjacent to non-forested wetlands and would be similar in their degree of protection. Alternative 3 would result in low risk due to expanded wetland management zones around non-forested wetlands.
- Alternatives 2 and 3 would provide the most stringent wetland mitigation for forest roads by implementing a policy of no net loss in wetland functions following road and landing construction.
- Alternatives 1 and 2 would not protect forested wetlands from harvest, except for those portions inside of riparian management zones or wetland management zones. Alternative 3 would protect forested wetlands by requiring the retention of a minimum of 70 percent canopy closure. Roads are to avoid wetlands under all alternatives.

Water Quality



Summary

- Alternative 1 would result in a low to moderate risk of stream temperature increases along fish-bearing streams and a high risk along nonfish-bearing streams. This alternative would result in a high risk of sediment-related effects on stream water quality. Alternative 1 would result in a low to moderate risk of localized pesticide contamination of surface waters; ground water contamination would not be expected.
- Under Alternative 2, there would be a low risk of temperature increases in fish-bearing streams and a moderate to high risk in nonfish-bearing streams. However, the effect of temperature increases in nonfish-bearing streams on downstream fish-bearing streams is uncertain, and the influence of these nonfish-bearing streams could be important in watersheds with a high degree of past harvest. Alternative 2 would result in a moderate risk of sediment water quality impacts in the short-term and a low to moderate risk in the long-term; there is a moderate degree of uncertainty associated with this conclusion. This alternative would result in a low risk of localized pesticide contamination of surface waters; ground water contamination would not be expected.
- Alternative 3 would result in a low risk of temperature increases in all streams. This alternative would result in a moderate risk of sediment water quality impacts in the short-term and a low risk in the long-term; there is a moderate degree of uncertainty associated with this conclusion. This alternative would result in a low risk of localized pesticide contamination of surface waters; ground water contamination would not be expected.

Fish

- Under Alternative 1, habitat degradation on private forest lands and eastside state forest lands would likely continue and contribute to further declines in listed fish species.
- Alternative 2 would result in a low to moderate risk of continued habitat degradation over the short-term. Over the long-term, monitoring and adaptive management would result in reductions in this risk.
- Alternative 3 would result in a low to very low risk of continued habitat degradation over the short-term. Over the long-term, monitoring and adaptive management would result in reductions in this risk even further.

Wildlife

- Alternative 1 would result in high risk for amphibian microhabitat variables along larger streams and essentially no protection along smaller streams. It would also produce high risk of impacts to refugia and unique habitats for target amphibians. Alternative 1 would provide high risk associated with habitat for most other riparian species.
- Alternative 2 would result in moderate risk for amphibian microhabitat variables along larger streams and high risk along smaller streams. It would produce low to moderate risk of impacts to refugia and unique habitats for target amphibians. Alternative 2 would provide low to moderate risk associated with habitat for most other riparian species.



- Alternative 3 would result in low risk for amphibian microhabitat variables along larger streams and moderate risk along high gradient streams. It would produce low risk of impacts to refugia and unique habitats for target amphibians. Alternative 1 would provide low risk associated with habitat for most other riparian species.

Fire

- Under Alternative 1, the risk of fire initiation and spread would be similar to current conditions.
- Alternative 2 would result in a slightly higher risk of fire initiation and spread relative to Alternative 1.
- Alternative 3 would result in a moderately higher risk of fire initiation and spread relative to Alternative 2. The risk of intense, stand-replacement fires would be highest and would increase over time.

Cultural Resources

- Alternative 1 would result in minimal incidental protection of undiscovered resources in riparian management zones and wetland management zones. Alternative 2 would result in significant incidental protection of undiscovered resources in riparian management zones and wetland management zones. Incidental protection of undiscovered resources in riparian management zones and wetland management zones would be greater under Alternative 3 than under Alternative 2.

Cumulative Effects

- Under Alternative 1, cumulative effects on the aquatic ecosystem would be addressed in watersheds that undergo watershed analysis. However, cumulative impacts would occur in other watersheds, especially those with high levels of past harvest or other disturbances; the rules under this alternative are not protective enough to prevent cumulative effects in these watersheds.
- Under Alternative 2, cumulative effects on the aquatic ecosystem would be addressed in watersheds that undergo watershed analysis, but only to a limited degree, since riparian and other prescriptions would not be modified as a result of the analysis. In addition, landowner incentive to conduct watershed analysis would be lower under Alternative 2, so their rate of implementation would be lower. Cumulative effects would also be addressed through SEPA review for those forest practices applications that are categorized as Class IV-Special. Very few other rules would directly address cumulative effects under Alternative 2. Although the riparian, forest roads, and unstable slope rules under this alternative would be substantially more protective than under Alternative 1, they are unlikely to be protective enough to prevent cumulative effects in watersheds containing high levels of past harvest or other disturbances. In particular, there is a high degree of uncertainty regarding the potential for cumulative effects relative to the lack of riparian management zones on many perennial and all seasonal nonfish-bearing streams. This uncertainty is increased in watersheds with a high level of recent past harvest.



Summary

- Alternative 3 would also address cumulative effects on the aquatic ecosystem to some degree through watershed analysis; again, however, riparian and other prescriptions would not be modified as a result of the analysis, and landowners would have less incentive to conduct watershed analyses, thus lowering their implementation rate. Under Alternative 3, some additional rules address cumulative effects (e.g., a rule limiting increases in road density and a rule limiting cumulative harvest in the rain-on-snow zone) and the riparian rules would be substantially more protective than under Alternatives 1 or 2. Therefore, cumulative effects are unlikely, except in watersheds with the highest level of past harvest or other disturbances.

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